

## **APPENDIX A-1**

### **U.S. COMMERCIAL NUCLEAR POWER REACTORS**

## **U.S. COMMERCIAL NUCLEAR POWER REACTORS**

Table A1-1 presents a list of the 104 commercial nuclear power reactors in the U.S. currently licensed to operate by the NRC. The reactor type (BWR or PWR) is listed, along with its electrical generating capacity, and its scaling factor, which is described in Section A.5.2.1. The scaling factors for PWRs and BWRs are listed in separate columns to enable the sum of these factors for each type of reactor to be calculated separately; however, the factors for individual PWRs and BWRs are calculated by the same formula. The year of projected shutdown is based on the expiration date of the current operating license, including, in three cases, credit for construction recapture. Construction recapture is defined as “[t]he maximum number of years that could be added to the license expiration date to recover the period from the construction permit to the date when the operating license was granted. A licensee is required to submit an application for such a change.” (U.S. NRC 2000)

Table A1-1. Nuclear Power Reactors Currently Licensed to Operate

Electric Utility	Reactor	Type	Power Rating (MWe) <sup>a</sup>	Scaling Factor <sup>b</sup>		Year of Projected Shutdown
				PWR	BWR	
Arizona Public Service	Palo Verde 1	PWR	1,227	1.146	—	2024
Arizona Public Service	Palo Verde 2	PWR	1,227	1.146	—	2025
Arizona Public Service	Palo Verde 3	PWR	1,230	1.148	—	2027
Baltimore Gas & Electric	Calvert Cliffs 1	PWR	835	0.887	—	2034
Baltimore Gas & Electric	Calvert Cliffs 2	PWR	840	0.890	—	2036
Boston Edison	Pilgrim 1	BWR	670	—	0.766	2012
Carolina Power & Light	Brunswick 1	BWR	767	—	0.838	2016
Carolina Power & Light	Brunswick 2	BWR	754	—	0.828	2014
Carolina Power & Light	H. B. Robinson 2	PWR	683	0.776	—	2010
Carolina Power & Light	Shearon Harris 1	PWR	860	0.904	—	2026
Centerior Energy	Davis-Besse	PWR	873	0.913	—	2017
Cleveland Electric	Perry 1	BWR	1,160	—	1.104	2026
Commonwealth Edison	Braidwood 1	PWR	1,100	1.066	—	2026
Commonwealth Edison	Braidwood 2	PWR	1,100	1.066	—	2027
Commonwealth Edison	Byron 1	PWR	1,105	1.069	—	2024
Commonwealth Edison	Byron 2	PWR	1,105	1.069	—	2026
Commonwealth Edison	Dresden 2	BWR	772	—	0.842	2006
Commonwealth Edison	Dresden 3	BWR	773	—	0.842	2011
Commonwealth Edison	LaSalle 1	BWR	1,036	—	1.024	2022
Commonwealth Edison	LaSalle 2	BWR	1,036	—	1.024	2023
Commonwealth Edison	Quad Cities 1	BWR	769	—	0.839	2012
Commonwealth Edison	Quad Cities 2	BWR	769	—	0.839	2012
Consolidated Edison	Indian Point 2	PWR	951	0.967	—	2013
Consumers Energy	Palisades 1	PWR	730	0.811	—	2011 <sup>c</sup>
Detroit Edison	Fermi 2	BWR	876	—	0.916	2025
Duke Power	Catawba 1	PWR	1,129	1.084	—	2024
Duke Power	Catawba 2	PWR	1,129	1.084	—	2026
Duke Power	McGuire 1	PWR	1,129	1.084	—	2021
Duke Power	McGuire 2	PWR	1,129	1.084	—	2023
Duke Power	Oconee 1	PWR	846	0.895	—	2033
Duke Power	Oconee 2	PWR	846	0.895	—	2033
Duke Power	Oconee 3	PWR	846	0.895	—	2034
Duquesne Light	Beaver Valley 1	PWR	810	0.869	—	2016
Duquesne Light	Beaver Valley 2	PWR	820	0.876	—	2027
Entergy Operations, Inc.	Arkansas Nuclear 1	PWR	836	0.887	—	2014
Entergy Operations, Inc.	Arkansas Nuclear 2	PWR	858	0.903	—	2018
Entergy Operations, Inc.	Grand Gulf 1	BWR	1,179	—	1.116	2022

Source: U.S. NRC 2000

<sup>a</sup> Net maximum dependable capacity<sup>b</sup> Scaling factor = (power rating/1000)<sup>2/3</sup> (see text)<sup>c</sup> Year assuming construction recapture

Table A1-1 (continued)

Electric Utility	Reactor	Type	Power Rating (MWe) <sup>a</sup>	Scaling Factor <sup>b</sup>		Year of Projected Shutdown
				PWR	BWR	
Entergy Operations, Inc.	River Bend 1	BWR	936	—	0.957	2025
Entergy Operations, Inc.	Waterford 3	PWR	1,104	1.068	—	2024
Florida Power Corp.	Crystal River 3	PWR	818	0.875	—	2016
Florida Power & Light	St. Lucie 1	PWR	839	0.890	—	2016
Florida Power & Light	St. Lucie 2	PWR	839	0.890	—	2023
Florida Power & Light	Turkey Point 3	PWR	693	0.783	—	2012
Florida Power & Light	Turkey Point 4	PWR	693	0.783	—	2013
GPU Nuclear	Oyster Creek	BWR	619	—	0.726	2009
GPU Nuclear	Three Mile Island 1	PWR	786	0.852	—	2014
Illinois Power	Clinton	BWR	930	—	0.953	2026
Indiana/Michigan Power	D. C. Cook 1	PWR	1,000	1.000	—	2014
Indiana/Michigan Power	D. C. Cook 2	PWR	1,060	1.040	—	2017
IES Utilities	Duane Arnold	BWR	520	—	0.647	2014
Nebraska Public Power	Cooper	BWR	764	—	0.836	2014
New York Power Authority	James A. Fitzpatrick	BWR	762	—	0.834	2014
New York Power Authority	Indian Point 3	PWR	965	0.977	—	2015
Niagara Mohawk	Nine Mile Point 1	BWR	565	—	0.683	2009
Niagara Mohawk	Nine Mile Point 2	BWR	1,105	—	1.069	2026
North Atlantic Energy	Seabrook 1	PWR	1,158	1.103	—	2026
Northeast Nuclear Energy	Millstone 2	PWR	871	0.912	—	2015
Northeast Nuclear Energy	Millstone 3	PWR	1,137	1.089	—	2025
Northern States Power	Monticello	BWR	544	—	0.666	2010
Northern States Power	Prairie Island 1	PWR	513	0.641	—	2013
Northern States Power	Prairie Island 2	PWR	512	0.640	—	2014
Omaha Public Power	Fort Calhoun	PWR	478	0.611	—	2013
Pacific Gas & Electric	Diablo Canyon 1	PWR	1,073	1.048	—	2021
Pacific Gas & Electric	Diablo Canyon 2	PWR	1,087	1.057	—	2025
PECO Energy	Peach Bottom 2	BWR	1,093	—	1.061	2013
PECO Energy	Peach Bottom 3	BWR	1,093	—	1.061	2014
Pennsylvania Power	Susquehanna 1	BWR	1,090	—	1.059	2022
Pennsylvania Power	Susquehanna 2	BWR	1,094	—	1.062	2024
Philadelphia Electric	Limerick 1	BWR	1,105	—	1.069	2024
Philadelphia Electric	Limerick 2	BWR	1,115	—	1.075	2029
Public Service E & G	Hope Creek 1	BWR	1,031	—	1.021	2026
Public Service E & G	Salem 1	PWR	1,115	1.075	—	2016
Public Service E & G	Salem 2	PWR	1,115	1.075	—	2020
Rochester Gas & Electric	Ginna 3	PWR	470	0.605	—	2009
South Carolina E & G	Summer	PWR	945	0.963	—	2022

<sup>a</sup> Net maximum dependable capacity<sup>b</sup> Scaling factor = (power rating/1000)<sup>2/3</sup> (see text)

Table A1-1 (continued)

Electric Utility	Reactor	Type	Power Rating (MWe) <sup>a</sup>	Scaling Factor <sup>b</sup>		Year of Projected Shutdown
				PWR	BWR	
Southern California Edison	San Onofre 2	PWR	1,070	1.046	—	2022 <sup>c</sup>
Southern California Edison	San Onofre 3	PWR	1,080	1.053	—	2022 <sup>c</sup>
Southern Nuclear	Edwin I. Hatch 1	BWR	805	—	0.865	2014
Southern Nuclear	Edwin I. Hatch 2	BWR	809	—	0.868	2018
Southern Nuclear	Joseph M. Farley 1	PWR	812	0.870	—	2017
Southern Nuclear	Joseph M. Farley 2	PWR	822	0.878	—	2021
Southern Nuclear	Vogtle 1	PWR	1,162	1.105	—	2027
Southern Nuclear	Vogtle 2	PWR	1,162	1.105	—	2029
STP Nuclear	South Texas 1	PWR	1,251	1.161	—	2027
STP Nuclear	South Texas 2	PWR	1,251	1.161	—	2028
Tennessee Valley Authority	Browns Ferry 1	BWR	1,065 <sup>d</sup>	—	1.043	2013
Tennessee Valley Authority	Browns Ferry 2	BWR	1,065	—	1.043	2014
Tennessee Valley Authority	Browns Ferry 3	BWR	1,065	—	1.043	2016
Tennessee Valley Authority	Sequoia 1	PWR	1,117	1.077	—	2020
Tennessee Valley Authority	Sequoia 2	PWR	1,117	1.077	—	2021
Tennessee Valley Authority	Watts Bar 1	PWR	1,117	1.077	—	2035
Texas Utilities Electric	Comanche Peak 1	PWR	1,150	1.098	—	2030
Texas Utilities Electric	Comanche Peak 2	PWR	1,150	1.098	—	2033
Union Electric	Callaway	PWR	1,171	1.111	—	2024
Vermont Yankee Nuclear	Vermont Yankee	BWR	510	—	0.638	2012
Virginia Electric & Power	North Anna 1	PWR	893	0.927	—	2018
Virginia Electric & Power	North Anna 2	PWR	897	0.930	—	2020
Virginia Electric & Power	Surry 1	PWR	801	0.862	—	2012
Virginia Electric & Power	Surry 2	PWR	801	0.862	—	2013
Washington Public Power	Washington Nuclear 2	BWR	1,107	—	1.070	2023
Wisconsin Electric Power	Point Beach 1	PWR	485	0.617	—	2010
Wisconsin Electric Power	Point Beach 2	PWR	485	0.617	—	2013
Wisconsin Public Service	Kewaunee	PWR	511	0.639	—	2013
Wolf Creek Nuclear	Wolf Creek 1	PWR	1,163	1.106	—	2025
Total				65.866	32.327	

<sup>a</sup> Net maximum dependable capacity<sup>b</sup> Scaling factor = (power rating/1000)<sup>2/3</sup> (see text)<sup>c</sup> Assuming construction recapture<sup>d</sup> Based on design characteristics—reactor has no fuel loaded and requires NRC approval to restart.

Table A1-2 lists the commercial nuclear power reactors that were formerly licensed but have been shut down. As was stated in Section A.5.2.2, the list excludes reactors whose owners have chosen the ENTOMB decommissioning alternative, and those with the DECON alternative that have begun or already completed decommissioning. It is unlikely that reactors in these categories would be clearing scrap metal in the foreseeable future. As before, scaling factors for PWR and BWR plants are listed in separate columns. For the purpose of the present analysis, the three non-light water reactors are treated as if they were BWRs.

The last column lists the date that significant quantities of scrap metal would be released from these reactors. For reactors in SAFSTOR, this is assumed to be 60 years after the shutdown date, while for those with the DECON alternative it is ten years after shutdown.

Table A1-2. Formerly Licensed Nuclear Power Reactors

Reactor	Type	Power Rating (MWe) <sup>a</sup>	Scaling Factor <sup>b</sup>		Alternative <sup>c</sup>	Year	
			PWR	BWR		Shutdown	Release <sup>d</sup>
Big Rock Point	BWR	72	—	0.173	DECON	1997	2007
CVTR	PTHW <sup>e</sup>	20	—	0.074	SAFSTOR	1967	2027
Dresden 1	BWR	210	—	0.353	SAFSTOR	1978	2038
Fermi 1	SCF <sup>e</sup>	60	—	0.153	SAFSTOR	1972	2032
GE VBWR	BWR	15	—	0.061	SAFSTOR	1963	2023
Haddam Neck	PWR	548	0.670	—	DECON	1996	2006
Humboldt Bay	BWR	60	—	0.153	SAFSTOR	1976	2036
Indian Point 1	PWR	185	0.325	—	SAFSTOR	1974	2034
La Crosse	BWR	50	—	0.136	SAFSTOR	1987	2047
Maine Yankee	PWR	732	0.812	—	DECON	1996	2006
Millstone 1	BWR	603	—	0.714	SAFSTOR	1998	2058
Peach Bottom 1	HTGR <sup>e</sup>	34	—	0.105	SAFSTOR	1974	2034
Rancho Seco	PWR	832	0.885	—	SAFSTOR <sup>f</sup>	1989	2049
San Onofre 1	PWR	404	0.547	—	SAFSTOR	1992	2052
Three Mile Island 2	PWR	831	0.884	—	<sup>g</sup>	1979	2039
Zion 1	PWR	975	0.983	—	SAFSTOR	1997	2057
Zion 2	PWR	975	0.983	—	SAFSTOR	1996	2056
Total	shut down reactors (see note)		6.088	1.922			
	including currently licensed reactors		71.954	34.249			

Source: U.S. NRC 2000

Note: excludes reactors at which DECON has started or been completed and those in ENTOMB status

<sup>a</sup> Licensed thermal capacity  $\times 0.3$ <sup>b</sup> Scaling factor = (power rating/1000)<sup>2/3</sup> (see text)<sup>c</sup> Selected decommissioning alternative<sup>d</sup> Year that significant quantities of scrap metal will be released—10 years after shutdown for the DECON alternative, 60 years for SAFSTOR<sup>e</sup> Metals inventory and contamination levels assumed same as for BWR<sup>f</sup> Dismantlement of radioactive secondary piping and components is ongoing<sup>g</sup> In monitored storage until TMI-1 is shut down, then both will be decommissioned

## REFERENCE

U.S. Nuclear Regulatory Commission (U.S. NRC). 2000. "Information Digest, 2000 Edition," NUREG-1350, Volume 12. U.S. NRC, Washington, DC.